CLAIMS

We claim:

1. A buffered solution for multiplexed binding assays using GPCR arrays, the solution having a composition comprising: a) a buffer reagent with a pH in the range of about 6.5 to about 7.9; b) an inorganic salt of either a monovalent or divalent species, at a concentration from about 1 mM to about 500 mM; and optionally a combination of: c) a blocker reagent at a concentration of about 0.01 wt.% to about 2 wt.% of the composition, or d) protease-inhibitor at a concentration of about 0.001 mM to about 100 mM, or both c) and d).

2. The buffered solution according to claim 1, wherein said pH is in a range of about 6.8-7.8.

3. The buffered solution according to claim 1, wherein said pH is about 7.4-7.5.

4. The buffered solution according to claim 1, wherein when said inorganic salt is a monovalent species, said concentration of said salt is about 10-500 mM.

5. The buffered solution according to claim 1, wherein when said inorganic salt is a divalent species, said concentration of said salt is about 1-50 mM.

6. The buffered solution according to claim 1, wherein said composition further comprising: a labeled ligand and a target compound.

7. The buffered solution according to claim 1, wherein said pH buffer is made from a solution having commonly used pH control reagents selected from Tris-HCl, HEPES-KOH, TES-NH_4OH, MOPS, acetate, citrate, citrate-phosphate, sodium-phosphate, maleate, or succinate buffers.

8. The buffered solution according to claim 1, wherein said inorganic salt may be selected from NaCl, KCl, $CaCl_2$, $MgCl_2$, $MgSO_4$, or $MnCl_2$.

9. The buffered solution according to claim 1, wherein said blocker reagent is a hydrophilic polymer, a biopolymer, or a water-soluble protein

10. The buffered solution according to claim 9, wherein said blockers characterized as a reagent that reduces background signal and does not interfere with the binding of a target molecule with the probe receptors within a biological membrane microspot.

11. The buffered solution according to claim 9, wherein said hydrophilic polymer is dextran, polyvinyl alchol, poly (ethylene glycol), poly(anetholsulfate), poly(vinyl sulfate), CM-Dextran, dextran sulfate, beta-cyclodextrin, poly(acrylic acid), poly(sodium 4-styrene sulfonate).

12. The buffered solution according to claim 9, wherein said biopolymer is poly-glutamate acid, or DNA.

13. The buffered solution according to claim 9, wherein said water-soluble protein is bovine serum albumin (BSA), casein, dry milk, or wheat germ agglutinin.

14. The buffered solution according to claim 1, wherein said solution is protease-free.

15. The buffered solution according to claim 1, wherein said protease inhibitor may include EDTA, EGTA, phenyl methyl sulforyl fluoride (PMSF), bacitracin, 4-(2-aminoethyl)benzenesulfonyl fluoride (AEBSF), 1,10-phenanthroline, E-64, antipain, aprotinin, benzamidine HCl, bestatin, chymostatin, ε-aminocaproic acid, N-ethylmaleimid, leupeptin, pepstatin A, phosphoramidon, trypsin inhibitor, and any combination of these.

16. A buffered solution for functional assays according to a GTP-analogue-binding profile approach, the solution having a composition comprising: a) a buffer reagent with a pH in the range of about 6.5 to about 7.9; b) a divalent inorganic salt, optionally together with a monovalent inorganic salt, at a concentration from about 1 mM to about

500 mM; c) guanosine 5'-diphosphate (GDP) salt at a concentration of about 0.5 mM to about 50 mM (1-10 mM); and optionally a combination of: d) a blocker reagent at a concentration of about 0.01 wt.% to about 2 wt.% of the composition, e) protease-inhibitor at a concentration of about 0.001 mM to about 100 mM, or f) an anti-oxidant reagent at a concentration of 0.01 mM to about 100 mM.

17. The solution according to claim 16, wherein said GTP-analogue includes fluorescein-GTPγS, Bodipy-fluorescein-GTPγS, Bodipy-TMR-GTPγS, Cy3-GTPγS, Cy5-GTPγS, Eu-GTP, ^{35}S-GTPγS.

18. The solution according to claim 16, wherein said GDP salt is selected from a group consisting of: lithium-, sodium-, and Tris-GDP salts.

19. The solution according to claim 16, wherein said anti-oxidant reagent includes sodium ascorbate, ascorbic acid, carotenoid lycopene, α-tocopherol, β-carotene, sodium azide.

20. The solution according to claim 16, wherein said anti-oxidant reagent has a concentration in a range of about 0.001 wt.% to about 0.5 wt.%

21. The solution according to claim 16, wherein said pH is in a range of about 6.8-7.8.

22. The solution according to claim 18, wherein said pH is about 7.4-7.5.

23. The solution according to claim 16, wherein said pH buffer is made from a solution having commonly used pH control reagents selected from Tris-HCl, HEPES-KOH, TES-NH_4OH, MOPS, acetate, citrate, citrate-phosphate, sodium-phosphate, maleate, or succinate buffers.

24. The solution according to claim 16, wherein said inorganic salt may be selected from NaCl, KCl, $CaCl_2$, $MgCl_2$, $MgSO_4$, or $MnCl_2$.

25. The solution according to claim 16, wherein said blocker reagent is a hydrophilic polymer, a biopolymer, or a water-soluble protein.

26. The solution according to claim 22, wherein said blockers characterized as a reagent that reduces background signal and does not interfere with the binding of a target molecule with the probe receptors within a biological membrane microspot.

27. The solution according to claim 22, wherein said hydrophilic polymer is dextran, polyvinyl alchol, poly (ethylene glycol), poly(anetholsulfate), poly(vinyl sulfate), CM-Dextran, dextran sulfate, beta-cyclodextrin, poly(acrylic acid), poly(sodium 4-styrene sulfonate).

28. The solution according to claim 22, wherein said biopolymer is poly-glutamate acid, or DNA.

29. The solution according to claim 22, wherein said water-soluble protein is bovine serum albumin (BSA), casein, dry milk, or wheat germ agglutinin.

30. The solution according to claim 16, wherein said solution is protease-free.

31. The solution according to claim 16, wherein said protease inhibitor may include EDTA, EGTA, phenyl methyl sulforyl fluoride (PMSF), bacitracin, 4-(2-aminoethyl)benzenesulfonyl fluoride (AEBSF), 1,10-phenanthroline, E-64, antipain, aprotinin, benzamidine HCl, bestatin, chymostatin, ε-aminocaproic acid, N-ethylmaleimid, leupeptin, pepstatin A, phosphoramidon, trypsin inhibitor, and any combination of these.

32. A method of reducing background signal due to non-specific binding of a labeled-ligand or GTP-analogue to a substrate surface, the method comprising: a) providing a buffered solution containing a blocker reagent; b) applying said solution to an array of GPCRs; c) applying a second solution containing a labeled ligand or GTP-

analogue, in either the absence or presence of a target compound; and d) monitoring or determining the binding of said labeled ligand to a receptor, or said GTP-analogue to a G-protein coupled with said receptor in said array.

33. The method according to claim 30, wherein said method further comprises a washing and dry step before data acquisition.

34. A method of reducing background signal due to non-specific binding of a labeled-ligand or GTP-analogue to a substrate surface, the method comprising: a) providing a solution containing a blocker reagent and a labeled ligand or GTP-analogue, in either the absence or presence of a target compound; b) applying said solution to a microarray of GPCRs; and c) monitoring or determining the binding of said labeled ligand to a receptor, or said GTP-analogue to a G-protein coupled with said receptor in said microarray.